ductions in the quantity of plasma clotting factors and as a result are not specific for either coagulopathy.

The plasma protamine sulfate test, using 0.1 percent protamine sulfate in plasma at 37°C, specifically reveals the presence of soluble fibrin. Soluble fibrin can only result from the action of thrombin on fibrinogen and in disseminated intravascular clotting thrombin, not plasmin, is the principal enzyme acting on fibrinogen.

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REFERENCES

Clarkson AR, Sage RE, Lawrence JR: Consumption coagulopathy and acute renal failure due to Gram-negative septicemia after abortion. Ann Intern Med 70:1191-1200, 1969

Niewiarowski S, Gurewich V: Laboratory identification of intravascular coagulation: The serial dilutation protamine sulfate test for the detection of fibrin monomer and fibrin degradation products. J Lab Clin Med 77:665-676, Apr 1971

The Significance of Triiodothyronine

TRIIODOTHYRONINE (T-3) once considered of only secondary importance compared to thyroxine (T-4), now appears responsible for the majority of the effects of thyroid hormones in normal subjects. A significant proportion, approximately one-third, of the T-4 metabolized daily is converted to T-3, and T-3 is three to four times as potent as T-4. These considerations have, in fact, raised a question whether T-4 has any intrinsic hormonal activity by itself or whether it serves merely as a "prohormone" for the hormone, T-3. The issue has not been settled fully as yet, although analysis of certain clinical situations does favor some direct hormonal role of T-4.

T-3 circulates in human serum in a concentration approximately one-seventieth that of T-4. Recent studies indicate that the T-4 to T-3 ratio in thyroglobulin is normally about 19 to 1 rather than 4 to 1 as surmised previously. Assuming that T-4 and T-3 are secreted in the same proportion that they exist in thyroglobulin, it can be calculated that only a minor fraction (approximately 20 to 30 percent) of circulating T-3 originates from thyroidal secretion. The remaining serum T-3 would appear to derive from extrathyroidal sources. Serum T-3 is normal in hypothyroid patients maintained on synthetic T-4 in a dose sufficient to increase serum T-4 concentration to normal. This finding strengthens the consideration that circulating T-3 derives mainly from extrathyroidal conversion of T-4.

The ratio of concentrations of serum T-3 to T-4 is considerably above normal in patients with Graves' disease. Therefore, the measurement of serum T-3, now available commercially, is even more helpful in the diagnosis of hyperthyroidism than is T-4. The entity of "T-3-thyrotoxicosis," where hypermetabolism is due to elevated serum T-3 in the face of normal serum T-4, is now established. It may be suspected in clinically hyperthyroid patients with diffuse goiter or in those with a solitary or multiple nodules in the thyroid gland. On the other hand, measurement of serum T-3 is a less definitive test for diagnosis of hypothyroidism, where measurements of serum T-4 and thyroid stimulating hormone (TSH) are more helpful.

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REFERENCES

Chopra IJ, Fisher DA, Solomon DH, et al: Thyroxine and triiodothyronine in human thyroid. J Clin Endocrinol 36:311, 1973

Chopra IJ, Solomon DH, Chua Teco GN: Thyroxine: Just a prohormone or a hormone too? J Clin Endocrinol 36:1050, 1973

Surks MI, Schadlow AR, Stock JM, et al: Determination of iodothyronine absorption and conversion of l-thyroxine to l-triiodothyronine using turnover rate techniques. J Clin Invest 52: 805, 1973

Human Tumor Viruses

IN RECENT YEARS viruses have been found in association with several human tumors. In no case, however, has a virus yet been shown to be the cause of human malignant disease. The prospect that human tumor viruses do exist and that methods may be available to identify and study them has been suggested in extensive experimental work with tumor viruses in lower animals. These studies have demonstrated remarkable similarities in the physical characteristics and biological behavior of tumor viruses from species to species. Among the known tumor viruses are the deoxyribonucleic acid (DNA) herpes viruses, such as the lymphoma-producing Marek's disease virus of chickens, and the ribonucleic acid (RNA) viruses with lipid-containing envelopes which cause mammary adenocarcinoma in mice and leukemias and lymphomas in chickens, mice, cats and probably other species.

One example of a virus found in association with human cancer is Epstein-Barr (EB) virus, a herpes virus. Patients with Burkitt's lymphoma and carcinoma of the postnasal space have very high titers of EB virus antibody in their blood, and EB virus has been found regularly in tissue culture cell lines established from lymphoma tissue. Although these tumors are quite rare, sero-